testaceis : capite sparse vage strigoso et punctulato : thorace minus transverso, subrotundato, antice magis quam antice angustato, angulis posticis rectis sed apice obtusis, lateribus late explanato-reflexis ; dorso undulatim haud acute striguloso : elytris elongato-oblongis, postice paullo latioribus, apice arcuatim truncatis, angulis acutis, subproductis, acute et profunde subpunctulato-striatis, interstitiis parum convexis sparsissime punctulatis, tertio punctis setiferis quatuor, octavo postice valde dilatato et in dilatatione bistriato. Tarsi articulo quarto valde bilobato, unguibus latis 10–11 *pectinatis. Venter setifero-punctulatus. Long.* 14 *millim.* ♀.

Kiu-Kiang. One example.

Colpodes superlita.

C. amœnæ (*Chaud.*) *simillima, sed differt elytris apice prope suturam rotundatis anguloque suturali haud dentato. Long.* 11 *millim.*

Kiu-Kiang. Of similar elongated subdepressed form to the widely-distributed Asiatic *C. amœna*, Chaud. (*splendens*, Moraw.), but differing in the form of the sublobular apex of the elytron, which in the latter is truncated near the suture, with dentate sutural angle, and, in *C. superlita*, simply rounded. The whole insect in both species is ruddy testaceous, with the surface of the elytra (*i. e.* excluding basal folds and epipleuræ) brassy green.

4. Report on a Collection of Echinoderms made at Tuticorin, Madras, by Mr. Edgar Thurston, C.M.Z.S., Superintendent, Government Central Museum, Madras. By Professor F. Jeffrey Bell, M.A., Sec. R.M.S.

[Received June 5, 1888.]

As the Society did me, last year, the honour to publish a report on a collection of Echinoderms from the Andaman Islands[1], I hope they will accept a notice of a collection from the opposite, or western, side of the Sea of Bengal. The specimens were collected in the course of last year by my friend Mr. Edgar Thurston, C.M.Z.S., who has presented a large number of them to the British Museum.

Before proceeding to give a list of this well-prepared series of specimens, I may be allowed to remind the student of the recent appearance of a memoir on the Echinoderm fauna of the Island of Ceylon[2], from which it is to be gathered that fifty-four species of Echinoderms are known from Ceylon. Shortly after the distribution of that memoir, my respected correspondent, M. de Loriol, was kind enough to write and tell me of four other species of

[1] P. Z. S. 1887, p. 139.

[2] Scientific Transactions of the Royal Dublin Society (2), iii. p. 643 *et seq.*

Echinoids, all of which had been collected at Aripo by M. Alois Humbert. Of these four (*Phyllacanthus annulifera*, *Temnopleurus reynaudi*, *Clypeaster humilis*, and *Laganum depressum*), *C. humilis* has been found by Mr. Thurston.

Of the Echinoderms collected by Dr. John Anderson, F.R.S., in the Mergui Archipelago, reports on the Ophiuroids by Prof. Martin Duncan, F.R.S., and on the Holothurians by myself have alone appeared as yet[1]; these, as well as the forthcoming reports by Dr. H. Carpenter and Mr. Sladen, should be consulted by the student who desires to make himself acquainted with the Echinoderm fauna of the Indian Ocean.

I shall probably best serve the cause of brevity and clearness if I follow the arrangement of the Andaman Report, and give first a list of the species collected, and then some notes and descriptions of the new species. With regard to some of the Temnopluroid forms and a new Ophiuroid, apparently allied to *Hemieuryale*, I reserve an account till I can deal with them in monographical detail. As usual, there are a few Holothurians which cannot be at present satisfactorily determined.

I. Crinoidea.

1. Antedon palmata, *Müll.*
2. —— reynaudi, *Müll.*
3. Actinometra parvicirra, *Müll.*

II. Asteroidea.

4. Echinaster purpureus, *Gray.*
5. Linckia lævigata, *Gmelin.*
6. Antherea pentagonula, *Lamk.*
7. Oreaster linckii, *De Bl.*
8. —— superbus, *Möbius.*
9. —— thurstoni, sp. n.
10. Asterina cepheus, *M. Tr.*
11. Luidia hardwickii, *Gray.*
12. —— maculata, *M. Tr.*
13. —— sp. (young).
14. Astropecten hemprichii, *M. Tr.*
15. —— sp. (young).

III. Ophiuroidea.

16. Pectinura gorgonia, *M. Tr.*
17. —— intermedia, sp. nov.
18. Ophiocoma erinaceus, *M. Tr.*
19. Ophiothrix longipeda, *M. Tr.*
20. Ophiothrix nereidina, *Lamk.*
21. Ophiomaza cacaotica, *Lyman.*
22. Hemieuryalid.

IV. Echinoidea.

23. Temnopleurus toreumaticus, *Leske.*
24. Temnopleuroid.
25. Salmacis bicolor, *Ag.*
26. —— dussumieri, *Ag.*
27. —— sulcata, *Ag.*
28. Stomopneustes variolaris, *Lamk.*
29. Echinometra lucunter, *Leske.*
30. Clypeaster humilis, *Leske.*
31. Lagamnum decagonale, *Less.*
32. Echinodiscus biforis, *Gm.*
33. Echinolampas oviformis, *Gm.*
34. Lovenia elongata, *Aud.*
35. Rhinobrissus pyramidalis, *A. Ag.*
36. Brissus unicolor, *Leske.*
37. Metalia sternalis, *Lamk.*

[1] Journal of the Linnean Society, Zool., vol. xxi. pp. 25 and 85.

V. Holothuroidea.

38. Haplodactyla australis, *Semp.*
39. Holothuria atra, *Jäger.*
40. —— marmorata, *Jäger.*
41. Holothuria monacaria, *Lesson.*
42. —— vagabunda, *Selenka.*

Notes and Descriptions.

Oreaster thurstoni.

A triplacanthid form, with the spines, except the five apicals, as a rule poorly developed.

R=2·7 *r*. Disk moderately elevated; lophial spines only just indicated; a spinous tubercle on both supero- and infero-marginal plates, very rarely more than one; no spines on the ventral plates. The arms rather short, wide at their base; marginals about twenty, both above and below; angles between the superomarginals, into which the pores extend. The spinous tubercles are very slight, and present no indication of becoming spines.

Adambulacral spinulation triplacanthid; spines of innermost row eight in number, diverging very gracefully, not very slender; in the middle and outer rows there are two or three spines in each cluster, and these are, as usual, much stouter; but the middle row is much more prominent than the outer. The granulation of the lower surface tends to take on a regular pattern, owing to the aggregation of the granules into tufts, in the centre of which is a spiniform tubercle. There is a plentiful supply of sessile bivalved pedicellariæ. The pore-areas of the dorsal surface are very distinctly marked on and near the disk, but are rather vaguer near the sides of the arms; there is no central apical spine; the five spines which end the lophial line are large and prominent, and have a marked tendency to double; the other spines of the lophial line are very inconspicuous. Along either side of that line there runs a row of small tubercles; outside these there is another row which does not extend beyond the disk; the constituents of these rows are quite small and inconspicuous. Madreporic tubercle large, just outside apical region, irregularly quadrate. Colour creamy yellow. R=130, *r*=47 millim.

Of the five specimens which I refer to this species three have the characters just enumerated; the two other examples differ to a somewhat remarkable extent from what appears to be the more typical form of the species. In one the apical spines are much less prominent than in the form already described, while the tubercles on either side are much more distinctly spinose, and many of the infero-marginal plates have several spinous tubercles in a tuft. In the other specimen the apical spines remain large, while the tubercles on either side become quite prominent, and the whole appearance of the form is thereby quite altered.

By many zoologists these three forms would be regarded as three distinct species; but I do not think that anybody who knows how Echinoderms vary will regard them as anything else than varieties of one and the same species. However, there are, in this instance,

a number of intermediate stages wanting, which Mr. Thurston will, I hope, be some day able to fill up.

This species is quite distinct from any of the triplacanthid Oreasters known to me.

Pectinura intermedia.

This species stands with *P. gorgonia*, *P. marmorata*, and *P. stellata*[1] of Mr. Lyman's arrangement; for it has the disk covered under its granulation with coarse scales, and there are pores between the first and second arm-plates; but the disk is flat, with the arm compressed from side to side and keeled superiorly, while there are eight arm-spines.

Radial shields naked, of moderate size, rather irregularly elliptical in form; the rest of the disk covered superiorly by a coarse granulation, beneath which are plates of fair size. The arms widest at their insertion, distinctly carinated; accessory mouth-shields of fair size; pores between first and second arm-plates only; near the base of the arms eight spines; upper arm-plates not broken. Eighteen mouth-papillæ, the outermost on either side small; its neighbour the largest of the series; four teeth. Mouth-shields irregularly hexagonal, the adoral edge the shortest; accessory mouth-shields irregularly semicircular in form; side mouth-shields tend to the form of an equilateral triangle; granulated space between mouth-papillæ and mouth-shield well-marked.

Lower arm-plates at first wider than long; further out they become unequally hexagonal, owing to the encroachment of the side-plates on the adoral edge; the upper arm-plates, near the edge of the disk, are quite three times as wide as they are long; further out their adoral edge becomes encroached on by the side-plates; the carination is best marked on the proximal half of the arm; while there are eight arm-spines near the base, there are only six some way out; the spines are always delicate and short; the two lowest are a little longer than the rest, but they are never so long as the side arm-plate. Two tentacle-scales.

The disk is, above, of a brownish hue, with yellowish patches and black dots; the radial shields are lighter, as is also the oral surface. The arms are banded lighter and darker, in sets of four or five; in the case of the darker bands the most proximal and the most distal plates are a good deal darker than the intermediate three.

Diameter of disc 18, 16 millim.; length of arm about 75 from the edge of the disk; width of arm at disk 4, 3·5; height of same 3·5, 3·5.

Rhinobrissus pyramidalis.

I should have less diffidence in assigning two specimens to this species had I been fortunate enough to have been enabled to compare with them the examples in the Liverpool Museum, on which

[1] This is the *Ophiopinax stellatus* of the 'Alert' Report (p. 136).

Prof. Alex. Agassiz based his description. I give the more important measurements of the larger of the two specimens, from which it will be seen that the proportions are very similar to those of the type :—

	millim.
Longest diameter	38·5
Greatest breadth	33
Height	21
Distance of apical system from anterior edge	21
Length of anterior petals	15
Length of posterior petals	16
Width of interporiferous space	4
Width of actinostome	9·5

Haplodactyla australis.

I think that Prof. Ludwig (SB. Ak. Berl. 1887, p. 1218) is right in regarding *H. andamanensis*, Bell, as a synonym of Semper's species ; but I may point out that the figure of the spicules given by Selenka differs somewhat from the representation drawn by Prof. Ludwig ; the resemblance between the latter and my figures of the spicules of *H. andamanensis* is very close.

Holothuria vagabunda.

With regard to this species I have to observe that, noting in one the great muscularity of the walls of the cloaca, I concluded it must have extensible Cuvierian organs ; I therefore opened another specimen, and found the cavity of the cloaca occupied by a mass of tubes, just as I figured it in the case of *H. nigra* (P. Z. S. 1884, p. 374) ; the third specimen had the tubes projecting from the vent, but still in organic connexion with the mass inside.

In concluding this paper it may be convenient to give, in a summary form, an account of the present state of our knowledge of the Echinoderm-fauna of the Sea of Bengal, taking as southern boundaries Ceylon on the west, and the Nicobars on the east[1]. This is a region which has not been touched by any recent explorations, such as the 'Challenger,' 'Alert,' or 'Gazelle.'

I. Crinoidea.

1. Antedon carinata, *Leach.*
2. —— adeonæ, *Lamk.*
3. —— reynaudi, *Müll.*
4. —— palmata, *Müll.*
5. Actinometra cumingii, *Müll.*
6. —— fimbriata, *Müll.*
7. —— parvicirra, *Müll.*

[1] In addition to the papers already cited, the list given by Dr. Lütken (Vid. Med. 1871, p. 272) has been used in the preparation of this summary. Information as to the Ophiurids collected by the 'Novara' at the Nicobars is to be found in Herr Marktanner-Turneretscher's paper in the 'Annalen des k. k. Naturh. Mus.' ii. p. 291 *et seq.*

II. Asteroidea.

8. Acanthaster echinites, *E. & S.*
9. Echinaster purpureus, *Gray.*
10. Fromia indica, *Perrier.*
11. —— milleporella, *Lamk.*
12. —— tumida, *Bell.*
13. Linckia lævigata, *Gm.*
14. —— pacifica, *Gray.*
15. Scytaster ægyptiacus, *Gray.*
16. —— galatheæ, *Ltk.*
17. —— variolatus, *Retz.*
18. Oreaster lincki, *de Bl.*
19. —— superbus, *Mobius.*
20. —— reinhardti, *Ltk.*
21. Oreaster thurstoni, *Bell.*
22. —— westermanni, *Ltk.*
23. Culcita grex, *M. Tr.*
24. —— novæ-guineæ, *M. Tr.*
25. —— schmideliana, *Retz.*[1]
26. Asterina burtoni, *Gray.*
27. —— cepheus, *Val.*
28. Luidia hardwickii, *Gray.*
29. —— maculata, *M. Tr.*
30. Astropecten hemprichii, *M. Tr.*
31. —— polyacanthus, *M. Tr.*
32. —— euryacanthus, *Ltk.*
33. Archaster typicus.

III. Ophiuroidea.

34. Pectinura gorgonia, *M. Tr.*
35. —— intermedia, *Bell.*
36. Ophiolepis annulosa, *M. Tr.*
37. —— cincta, *M. Tr.*
38. —— nodosa, *Dunc.*
39. Ophioplocus imbricatus, *M. Tr.*
40. Ophiactis savignii, *Audouin.*
41. Ophiophragmus affinis, *Dunc.*
42. —— difficilis, *Dunc.*
43. Ophiocnida sexradia, *Dune.*
44. Ophiocoma scolopendrina, *Lamk.*
45. —— æthiops, *Lamk.*
46. —— brevipes, *Lamk.*
47. Ophiomastix annulosa, *M. Tr.*
48. Ophiarachna incrassata, *M. Tr.*
49. Ophiothrix longipeda, *Lamk.*
50. —— nereidina, *Lamk.*
51. Ophiothrix martensi, *Lyman.*
52. —— punctolimbata, *Martens.*
52*a*. —— galateæ, *Ltk.*
52*b*. —— hirsuta, *M. Tr.*
52*c*. —— comata, *M. Tr.*
53. —— andersoni, *Dune.*
54. —— merguiensis, *Dunc.*
55. —— variegata, *Dune.*
56. —— variabilis, *Dunc.*
57. Ophiocampsis pellicula, *Dunc.*
58. Ophiocnemis marmorata, *Lamk.*
59. Ophiomaza cacaotica, *Lym.*
60. Ophiothela holdsworthi, *Smith.*
60*a*. Ophiolophus novaræ, *Markt.*
61. Hemieuryalid.
61*a*. Trichaster elegans, *Ludw.*
62. Astrophyton clavatum, *Lym.*

IV. Echinoidea.

63. Phyllacanthus annulifera, *Lamk.*
64. —— imperialis, *Lamk.*
65. —— verticillata, *Lamk.*
66. Diadema setosum, *Gray.*
67. Echinothrix calamaria, *Pall.*
68. Astropyga radiata, *Leske.*
69. —— freudenbergi, *Sarass.*
70. Asthenosoma urens, *Sarass.*
71. Echinus angulosus, *Leske.*
72. Toxopneustes pileolus, *Lamk.*
73. Tripneustes gratilla, *L.*[2]
74. Temnopleurus toreumaticus, *Leske.*
75. —— reynaudi, *Ag.*
76. Temnopleurid.
77. Salmacis bicolor, *Ag.*
78. —— dussumieri, *Ag.*
79. —— rarispina, *Ag.*
80. Salmacis sulcata, *Ag.*
81. Stomopneustes variolaris, *Lamk.*
82. Echinometra lucunter, *Leske.*
83. —— oblonga, *de Bl.*
84. Colobocentrotus atratus, *L.*
85. Clypeaster humilis, *Leske.*
86. Laganum decagonale, *Less.*
87. —— depressum, *Ag.*
88. Arachnoides placenta, *L.*
89. Echinodiscus biforis, *Gm.*
90. Echinoneus cyclostomus, *Leske.*
91. Echinolampas oviformis, *Gm.*
92. Lovenia elongata, *Aud.*
93. Maretia alta, *A. Ag.*
94. Rhinobrissus pyramidalis, *A. Ag.*
95. Brissus unicolor, *Leske.*
96. Metalia sternalis, *Lamk.*
97. Moira stygia, *A. Ag.*

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[1] "*Randasia granulata*" may be the young of one of these species of *Culeita* or of an unknown species; it has been taken at the Andamans.

[2] See Prof. Lovén's valuable memoir, just published, on the Linnean species of *Echinus* (Bih. Svensk. Vet.-Akad. Handl. Bd. 13. Afd. iv. no. 5, p. 77).

V. Holothurioidea[1].

98. Synapta beselii, *Jäger*.
99. —— grisea, *Semp.*
100. —— recta, *Semp.*
101. Chirodota rufescens, *Brdt.*
102. Haplodactyla australis, *Semp.*
103. Cucumaria assimilis, *Bell.*
104. —— forbesi, *Bell.*
105. Colochirus armatus, *Marenz.*
106. Ocnus javanicus, *Sluiter.*
107. —— typicus, *Théel.*
108. Thyone sacellus, *Sel.*
109. Pseudocucumis acicula, *Semp.*
110. Actinopyga echinites, *Jäger.*
111. —— lecanora, *Jäger.*
112. —— mauritiana, *Q. & G.*
113. —— miliaria, *Q. & G.*
114. Holothuria albida, *Bell*[2].
115. Holothuria argus, *Jäger.*
116. —— atra, *Jäger.*
117. —— cadelli, *Bell*[3].
118. —— cæsarea, *Ludwig.*
119. —— fusco-cinerea, *Jäger.*
120. —— imitans, *Ludwig.*
121. —— impatiens, *Forsk.*
122. —— maculata, *Brdt.*
123. —— marmorata, *Jäger.*
124. —— monacaria, *Less.*
125. —— ondaatjei, *Bell.*
126. —— papillata, *Bell.*
127. —— pardalis, *Sel.*[4]
128. —— spinifera, *Théel.*
129. —— vagabunda, *Sel.*
130. Stichopus chloronotus, *Brdt.*
131. —— variegatus, *Semper.*

If we bear in mind that our knowledge of the Echinodermata of the Indian Ocean is still in a comparatively unsatisfactory condition, or, in other words, remember that some of the species, such as *Fromia tumida, Pectinura intermedia, Holothuria ondaatjei*, which are as yet known only from the Bengal Sea, may be found elsewhere when a search is made for them, we can at present only conclude that we have here to do with representatives of the inter-tropical fauna which extends across the Indo-Pacific area, and whose limits appear to be marked by thermal lines[5].

[1] Prof. Ludwig has lately published a list of the species of Holothurians collected at Ceylon by Dr. P. and Dr. F. Sarasin (SB. Akad. Berlin, 1887, pp. 1217–29).

[2] Prof. Ludwig considers this to be a synonym of *H. edulis*, Lesson.

[3] = *H. scabra*, Jäger, *teste* Ludwig.

[4] = *H. insignis*, Ludw., *H. lineata*, Ludw., *H. peregrina*, Ludw., *teste* Ludwig (*l. c.*).

[5] See 'Alert Report,' p. 174.

Since this paper was read Dr. Herbert Carpenter and Mr. Sladen have read to the Linnean Society an account of the Crinoids, Asterids, and Echinoids collected at Mergui by Dr. Anderson.

Dr. Carpenter informs me that the Crinoids were:—

Antedon elegans, andersoni (sp. n.), *milberti, conjungens* ('Challenger'), *spicata.*
Actinometra notata (sp. n.).

Mr. Sladen tells me that the Asterids were:—

Archaster typicus.
Astropecten andersoni (sp. n.), *hemprichii, notograptus*, sp. n.
Luidia forficifer (Sladen, 'Challenger'), *maculata.*
Goniodiscus articulatus.
Nepanthia suffarcinata, sp. n.
Asterina cepheus. —

And the Echinoids:—

Temnopleurus toreumaticus.
Salmacis suleata, dussumieri, bicolor.
Laganum depressum.
Arachnoides placenta.

I am greatly indebted to my friends for these lists, which bring up the total of Echinoderms now known from the Sea of Bengal to 147 species.